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CLAIMS:

What is claimed is:

- 5 A1. A device driver, in a computer readable medium,
suitable for communication with a plurality of different
devices, wherein the plurality of different devices
conform to a standard, the device driver comprising:
saving means, responsive to an application that
10 accesses a device within the plurality of different
devices transitioning from a foreground mode to a
background mode, for saving state information from within
the device using commands conforming to the standard for
the plurality of different devices; and
15 restoring means, responsive to the application
transitioning from the background mode to a foreground
mode, for restoring the saved state information back into
the device using commands conforming to the standard of
the plurality of different devices, wherein knowledge of
20 differing aspects between the plurality of different
devices conforming to the standard is absent in the
device driver.
- A2. The device driver of claim A1, wherein the state
25 information includes data stored in memory buffers to
allow for differing aspects between devices within the
plurality of different devices.

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30 A3. The device driver of claim A2, wherein the data stored in the memory buffers may vary in size and number.

A4. The device driver of claim A1, wherein the commands conforming to the standard include hardware commands.

35 A5. The device driver of claim A1, wherein the device driver includes emulated memory and registers and wherein at least a portion of the state information saved by the saving means, relating to a basic device type, is saved into a portion of the emulated memory and registers, and
40 wherein the device driver further includes:

a trapping means for trapping input/output calls, from an application running in a background mode, in which changes attempted to the device memory and registers of the device are made instead to the emulated
45 memory and registers, and those changes relating to the basic device type, are subsequently restored to the device by the restoring means from the emulated memory and registers.

50 A6. The device driver of claim A4, wherein the basic device type is standard VGA.

A7. The device driver of claim A1, wherein the commands conforming to the standard for the plurality of different
55 devices are BIOS calls.

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A8. The device driver of claim A7, wherein the device is a video adapter, which includes a VESA BIOS and wherein the BIOS calls are VESA standard BIOS calls.

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A9. The device driver of claim A8, wherein the device driver is a virtual video device driver.

A10. The device driver of claim A9, wherein the VESA
65 standard BIOS calls used in the saving means and in the restoring means are performed within a virtual machine instead of being performed directly by the virtual video device driver.

70 A11. The device driver of claim A9, wherein the VESA standard BIOS calls used in the saving means and in the restoring means are performed directly by the virtual video device driver instead of being performed within the virtual machine.

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A12. The device driver of claim A9, wherein the VESA standard BIOS calls used in the saving means and in the restoring means are performed directly by other operating system services instead of being performed within the
80 virtual machine.

B1. A video device driver, in a computer readable medium, suitable for communication with a plurality of different types of video devices, wherein the plurality
85 of different types of video devices conform to a standard including a BIOS, the video device driver comprising:

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interrogation means for polling a video device having a type within the plurality of different types of video devices for obtaining video mode dimension
90 information using BIOS commands conforming to the standard;

drawing means for drawing within a window a scaled picture of a state of the video device when the video device is in a selected mode, wherein the drawing means
95 uses the video mode dimension information and a current copy of the VRAM from the video device to draw the scaled picture within the window;

saving means, responsive to an application that accesses the video device transitioning to a background
100 mode, for saving state information from within the video device using commands conforming to the standard for the plurality of different types of video devices; and

restoring means, responsive to the application transitioning from the background mode to a foreground
105 mode, for restoring the saved state information back into the video device using commands conforming to the standard for the plurality of different types of video devices, wherein advanced knowledge of differing aspects between the plurality of different types of video devices
110 conforming to the standard is absent in the video device driver.

B2. The video device driver of claim B1, further comprising:

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115 determination means for determining an amount of the
VRAM to be saved by the saving means and restored by the
restoring means.

B2A. The video device driver of claim B2, wherein the
120 amount of VRAM saved represents a currently viewable area
on a display screen.

B3. The video device driver of claim B1, wherein the
video device driver is a virtual video device driver.

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B4. The video device driver of claim B2, wherein the
video device driver includes:

trapping means for receiving BIOS video mode setting
calls made by an application such that the virtual video
130 device driver may use the interrogation means to
temporarily freeze the application when the application
is operating in the background mode and setting a video
mode, which is unemulatable in the background mode.

135 B4A. The video device driver of claim B2, wherein the
video device driver includes:

trapping means for receiving BIOS video mode setting
calls made by an application such that the virtual video
device driver may use the interrogation means to
140 temporarily bring the application to the foreground when
the application is operating in the background mode and
setting a video mode, which is unemulatable in the
background mode.

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145 B5. The video device driver of claim B4, wherein the standard is a VESA standard, the video mode is a VESA BIOS video mode, and the BIOS is a VESA BIOS.

B6. The video device driver of claim B2, wherein the
150 video device driver includes:

trapping means for receiving BIOS video mode setting calls made by an application such that the virtual video device driver may use the interrogation means to bring the application to the foreground mode when the
155 application is operating in the background mode and setting a video mode, which is unemulatable in the background mode.

B7. The video device driver of claim B6, wherein the
160 standard is a VESA standard, the video mode is a VESA BIOS video mode, and the BIOS is a VESA BIOS.

C1. A device driver, in a computer readable medium,
165 suitable for communication with a plurality of different devices, wherein the plurality of different devices conform to a standard, the device driver comprising:

identification means for identifying all
input/output ports relating to a basic device type common
170 to the plurality of devices;

interrogation means using commands conforming to the standard and common to the plurality of devices for polling a device within the plurality of devices to obtain input/output ports used by a device in addition to

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175 the input/output ports identified by the identification means; and

trapping means for trapping input/output ports identified by the identification means and the interrogation means.

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C2. The device driver of claim C1, wherein the device includes a PCI BIOS and wherein the commands conforming to the standard used in the interrogation means are PCI standard BIOS calls.

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C3. The device driver of claim C2, wherein the device is a video adapter and the basic device type is an abstract SVGA including a standard VGA and additional non-standard VGA input/output ports used by the basic device type.

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C4. The device driver of claim C1, wherein additional input/output ports used by the basic device type are identifiable during installation of the device by a user option.

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C5. The device driver of claim C1, wherein additional input/output ports used by the basic device type are identifiable during installation by the device as removed from the basic device type and unused by the device
200 through a user option.

D1. A method in a computer used by a device driver for communicating with a plurality of different devices, wherein the plurality of different devices conform to a

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205 standard, the method comprising the computer implemented steps of:

saving state information from within the device using commands conforming to the standard for the plurality of different devices in response to an application that accesses a device within the plurality of different devices transitioning to a background mode, and

restoring the saved state information back into the device using commands conforming to the standard of the plurality of different devices in response to the application transitioning from the background mode to a foreground mode.

D2. The method of claim D1, wherein the state information includes untyped memory buffers of varying size and number to allow for differing aspects between devices within the plurality of different devices.

D3. The method of claim D1, wherein the commands conforming to the standard include hardware commands.

D4. The method of claim D1, wherein the device driver includes emulated memory and registers and wherein at least a portion of the state information saved by the saving step, relating to a basic device type, is saved into a portion of the emulated memory and registers, and further comprising:

trapping input/output calls, from an application running in a background mode, in which changes attempted

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235 to the device memory and registers of the device are made
instead to the emulated memory and registers, and those
changes relating to the basic device type, are
subsequently restored to the device by the restoring
means from the emulated memory and registers.

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D5. The method of claim D4, wherein the basic device
type is standard VGA.

D6. The method of claim D1, wherein the commands
245 conforming to the standard for the plurality of different
devices are BIOS calls.

D7. The method of claim D6, wherein the device is a
video adapter which includes a VESA BIOS and wherein the
250 BIOS calls are VESA standard BIOS calls.

D8. The method of claim D7, wherein the device driver is
a virtual video device driver.

255 D9. The method of claim D8, wherein the VESA standard
BIOS calls used in the saving step and the restoring step
are performed within a virtual machine instead of being
performed directly by the virtual video device driver.

260 D10. The method of claim D8, wherein the VESA standard
BIOS calls used in the saving step and in the restoring
step are performed directly by the virtual video device
driver instead of being performed within the virtual
machine.

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D11. The method of claim D8, wherein the VESA standard BIOS calls used in the saving step and in the restoring step are performed directly by other operating system services instead of being performed within the virtual machine.

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E1. A computer program product in a computer readable medium for a device driver that is capable of communicating with a plurality of different types of devices, wherein the plurality of different types of devices conform to a standard, the computer program product comprising:

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first instructions for saving state information from within the device using commands conforming to the standard for the plurality of different types of devices in response to an application that accesses a device within the plurality of different types of devices transitioning from a foreground mode to a background mode, and

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second instructions for restoring the saved state information back into the device using commands conforming to the standard of the plurality of different types of devices in response to the application transitioning from the background mode to a foreground mode.

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E2. The computer program product of claim E1, wherein the state information includes untyped memory buffers of varying size and number to allow for differing aspects

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between devices within the plurality of different types
295 of devices.

E3. The computer program product of claim E1, wherein
the commands conforming to the standard include hardware
commands.

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E4. The computer program product of claim E1, wherein
the device driver includes emulated memory and registers
and wherein at least a portion of the state information
saved by the saving step, relating to a basic device
305 type, is saved into a portion of the emulated memory and
registers, and further comprising:

third instructions for trapping input/output calls,
from an application running in a background mode, in
which changes attempted to the device memory and
310 registers of the device are made instead to the emulated
memory and registers, and those changes relating to the
basic device type, are subsequently restored to the
device by the restoring means from the emulated memory
and registers.